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ABSTRACT

The notion of a linguistic "register" is useful in posing questions about how the ways language is used differ from one kind of human activity to another. This paper analyzes a videotaped segment of male grade 4/5 students (n=3) who are talking as they work to build a tower from plastic drinking straws and pins. Discussion of the analysis includes: language in group activity, thematic and social interaction, non-verbal dimension, and problem solving: semiotics and situated cognition. Appendices include an analytical transcript and actual transcript. Contains 28 references. (MKR)

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# TALKING TOWERS, MAKING WITHS

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## Language in Group Activity

The notion of a linguistic register (Gregory 1967, 1978; Halliday 1977, 1978) is useful in posing questions about how the ways we use language differ from one kind of human activity to another. Informal conversation, writing poetry or theoretical treatises, directing someone's movements, and getting work done in a group may all rely on language, but they tend to use different linguistic resources to different degrees for their different purposes. A functional analysis of the semantic and grammatical resources of language (e.g. Halliday 1978, 1985; Martin 1992; Hasan 1989, 1995) lends itself to identifying which kinds of resources are most in demand in different types of activity.

Martin (1992) has made a useful distinction of this kind between activities in which our uses of language are ancillary or auxiliary to some other individual or more commonly social-interactive work, vs. those in which the use of language itself constitutes the work. In conversation for the sake of the talk itself (i.e. its social and informational content and effects), or in writing (solo or collaborative), we tend to use language constitutively. When we are trying to get something else done (playing a game, building a tower, or more generally co-ordinating people's nonverbal actions), we are using language more in its ancillary function.

In the videotaped segment we are analyzing for this symposium (see transcript below), three grade 4/5 students (all male) are talking as they work to build a tower from plastic drinking straws and pins (for joining them). What they say may not make much sense apart from a viewing of the tape, or a description of the nonverbal action, because language by itself does not organize the total activity (as it does in reading, writing, lectures, sermons, and most conversations). Whether lexically explicit or not, most utterances in this bit of activity depend for the construal of their meaning, and their relations to one another, on a knowledge of, and perhaps a direct participation in, the nonverbal processes which accompany them (including relations to the nonverbal objects or participants in these processes).

SE 055 441



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Under these conditions, there is an especially intimate interdependence between the social-interactional uses of language and the thematic-representational ones (cf. Lemke 1990). Interpreting either of these dimensions of the flow of activity requires reference to the immediate nonverbal context of situation. While it is analytically useful to separate language from nonverbal activity in order to foreground their relationships, and the social-interactional dimension from the thematic-represenational one for the same reason, we need to be clear that this is an artificial division. The units of analysis most appropriate to this activity are units of social-semiotic action (cf. Lemke 1995a): they are simultaneously and inseparably material and ecological processes, social-interactional processes, and semiotic cultural meaning-making practices.

A general hypothesis about such meaningful and meaning-making eco-social activities (Lemke 1994, 1995a, in press-a) is that their semiotic side necessarily integrates a Presentational function (constructing meanings about Participants engaged in Processes under Circumstances), an Orientational one (constructing social relationships and evaluative attitudes), and an Organizational one (constructing relations of wholes and parts, structurally and texturally). None of these can be properly analyzed apart from the other two, because each contributes indirectly, through the conventions of grammar, semantics, and discourse formations such as genres, narrative forms, etc., to the others. The unit under analysis in each case belongs to a hierarchy of levels in the structure of human action; at each level we are analyzing whole actions, not just linguistic forms. Indeed many of the constituent actions may have no linguistic form at all (e.g. pulling straws off part of the tower).

I propose here just to make some general observations about the kinds of phenomena in this episode which would be of interest to me. I will try to highlight the points at which language and other modes of action are important for interpreting the whole flow of activity, and also to connect the thematic and social-interactional dimensions of the whole activity. (The organizational dimension is necessary to enable the other two functions to span from unit to unit and so is always in play.)

It is interesting in this episode, I think, to make a very simple thematic analysis at the level of cohesion chains (Halliday & Hasan 1976, 1989; Hasan 1984; Lemke 1983, Lemke 1995b, in press-b). I will refer to this aspect of the analysis as 'Talking Towers', though obviously all aspects of the talk contribute to getting the tower built. I will focus on the use of key words (really <u>thematic items</u>, since close synonyms or even an implied use count as instances of the same item for analytical purposes): cone, pyramid, square, cube.

It is also interesting to consider the social-interaction patterns among the three students. I will refer to this as 'Making Withs' (after Goffman's notion of a 'with' as an interactional engagement

which we accomplish by deploying the meaningful social resources of everyday behavior). I will focus on the rhetorical level of verbal interaction (questions and answers, statements and rejoinders, etc.), and on the proxemic aspects of the nonverbal interaction.

While there is not quite enough data available here to ground a fully convincing analysis, I will also try to make some suggestions about the 'situated cognition' which is going on (cf. Lave 1988, Lave & Wenger 1991, Lemke in press-c). The three students are not the only linguistic or actional participants (cf. actants in the usage of Greimas & Cortes 1982 or Latour 1987, 1988) which are materially interacting in the event, or which are being represented verbally in it. The architectural constructions, and a pair of scissors, also seem to play key roles in this episode.

## Thematics and Social Interactions

In the Analytical Transcript (Table 1, appended) I have visually separated the three participants' contributions into separate columns. In the print version (not in the electronic one, unfortunately), I have indicated by arrows to which prior contribution a later one refers, usually as challenge or agreement. I have also highlighted the key thematic items, such as SQUARE and PYRAMID. (Brackets indicate something not explicitly said, but thematically implied or thematically equivalent to what was said.)

The first part of the transcript is from the time just before the opening of our focal 'Problem Solving' episode. It highlights Tim's introduction of the term CONE-TOP and his 'ownership' of it and defense of the relevance of this construction when Simon says they can't use it, yet. The last section follows the focal episode and shows, rather more loosely, how some of its themes are distributed among the participants soon after.

Thematically, the most interesting feature of the transcript for me is that particular thematic items are closely associated with particular participants, and some of them then 'migrate' to the columns of one or both of the others. The patterns of who is using 'whose' words are very interesting in relation to Bakhtin's notions of dialogicity in discourse (1935, 1953), as well as providing an initial take on the thematic aspects of the interaction among the students. What does the discourse tell us about how key thematic terms, and the concepts whose use they represent, pass back and forth, or don't?

CONE or CONE-TOP is associated with Tim. No one else uses this term but Tim until well after the end of the focal episode, when suddenly, after being reintroduced by Tim after a long absence from the dialogue, it is taken up by both Andy and Simon.

PYRAMID is associated with Simon. Andy echoes it after Simon first introduces it (lines 4,5), but otherwise no one else uses it again except Simon.

SQUARE is introduced by Andy as a follow-up to his single echoing of PYRAMID (line 5). He reintroduces it in line 22, when it gets taken up at first tentatively (line 23) and then substantively (line 25) by Tim.

CUBES is also introduced by Andy, and 'adopted' by him (lines 26,28). After the focal episode, it is reintroduced by Tim, and then used by all three. Soon after, exactly the same thing happens to CONE.

It is striking how these words become associated with a particular speaker and then are either immediately or only long after taken up by others. Thematically, we can pose the question of how well these chains of words indicate the use or non-use by each individual of the corresponding concepts, and also what the thematic and conceptual progressions are by which the actual thematic sequence develops.

So, for example, how is SQUARE in line 5 conceptually linked to PYRAMID? Do Simon and Andy share the same concept, differently expressed? Does Andy extract from Simon's use of PYRAMID a key feature, the SQUARE base? Is his later use of SQUARE (line 22) also cued by Andy's PYRAMID in lines 19,21? The term and concept SQUARE are used in relation to different visual-tactile objects in line 22 from lines 5 and 24, and a key link is made by way of this thematic item from the meaning in line 22 to that in 24 (SQUARE bottom for the CONE-TOP vs. SQUARE top of the base of the tower).

What is the conceptual relation of SQUARE to CUBES in lines 22-26? How does this get constructed in the activity itself?

We will come back to these questions later, but first I want to consider the social-interactional dimension, the making of 'withs' that is going on simultaneously with making these thematic chains and exchanges.

Looking just at the transcript, we have an episodic subdivision that is based on both thematic and social-interactional criteria. Major activity boundaries normally correspond to discontinuities by both kinds of criteria; units are integrated across minor boundaries by continuity in one or both (Lemke 1995b). The pre-focal section highlights a little exchange between Tim and Simon. Tim claims a kind of status and glory for his part of the project and is taken down a peg by Simon. The focal episode is subdivided into four main sections and a coda. Each of these sections begins with a contribution by Tim, followed by the responses of the others and some interaction.

In the first of these (lines 1-5), Tim proudly announces that he's made his CONE-TOP. This time it's Andy who deflates him. Simon supports Andy in his claim that the triangular bottom of the CONE-TOP won't match the square base of the tower, a pyramid shape would be better.

In the second (lines 6-15), Tim offers a solution: just attach it with support straws. This gets two objections, one from Simon (too hard) and one from Andy (won't look good). Simon and Andy support each other's objections. Tim denies them. Finally Simon says the support straws solution won't work.

Now (lines 16-24), Tim offers another solution: cut it down. This meets agreement from the others, but it is not clear thematically what it means. Andy offers 'cut the bottom' but Simon reintroduces PYRAMID (line 21), and Andy adopts this in the form of saying the 'bottom needs to be SQUARE'. He now has a dialogue with Tim, from which Andy withdraws, in which he first explains why and what he means Tim should do, and then responds to a new initiative from Tim.

In this last section (lines 25-28), Tim offers a difficulty, that the SQUARE bottom of the CONE-TOP would be a lot smaller than the SQUARE top of the tower's base, and Andy provides a solution (gradually smaller CUBES from base to CONE-TOP). Tim agrees to this plan.

In the Coda, Simon initiates a brief consideration of further details (how many cubes, the basic shape of the tower).

In the post-focal section it becomes clear that they all accept the basic BASE-CUBES-CONETOP plan.

## The Non-Verbal Dimension

The social-interaction aspects of the episode are signalled not just verbally, but also by the proxemic and kinesic patterns of the students' activity.

In the pre-focal section, Tim was partway up on the table, leaning into the dyad of Simon and Andy, who were facing each other across the bottom of the table (see appended diagram in print version). They were a fairly tight group, and this unity was defended against Stephen who briefly intruded, even sticking his head into the center of the group. Tim and Simon orient to each other in the section in the transcript.

In the focal episode, however, Tim gets down to pick something up and then stands, facing into the camera, more distant from the Simon-Andy dyad, as he announces his creation of the CONE-TOP. During the three sections in which he is at verbally at odds with Simon and Andy, they are proxemically close and very cohesive with one another, excluding Tim.

This changes at about line 22-24, when Tim comes around next to Simon and facing Andy. Their interaction changes from argumentative to collaborative at this point, as Andy explains to Tim about the SQUARE match-up. As their exchange continues into the fourth section, they orient more and more to each other, get closer across the table, and Simon withdraws, moving back from the table, doing his own thing. The

structure of interaction has now changed completely from Tim vs. Simon and Andy to Tim and Andy vs. Simon (not in the sense of opposition, but of proxemic grouping and spatial-attentional orientation).

In the Coda, Simon rejoins the discussion, but by this time Tim and Andy have both retreated somewhat from their close-knit 'with' to their separate division of labor.

The post-focal proxemics was not available on the section of the video sent for analysis.

What we see here is the very close synchronization of the changing verbal relationships, both social-interactional (i.e. rhetorical, as in agreements and disagreements) and thematic (in terms of taking up the thematic items of others), with the changing nonverbal (proxemic and orientational) relationships. Each is clearly abetting the others, and the optimal unit of analysis here is clearly the whole action-stream.

## Problem-Solving: Semiotics and Situated Cognition

With all these pieces in place, let's go back now to the central interest of the episode in terms of scientific and engineering inquiry: the formulation and solution of the problem of how to connect the CONE-TOP to the SQUARE base of the tower.

I want to describe the action in relation to this emergent agenda in terms of the semiotic resources available and their situated deployment. I want to argue, in effect, that the immediate material situation itself: the co-presence of the three students, the visual-tactile constructions of the tower-base, cone-top, etc., and even the presence on the table of a scissors, as well as the linguistic resources of thematic items/relations and interactional speech-act types/rhetorical genres, abets and facilitates, <u>enables and shapes</u> the actional sequence which we interpret as problem-solving.

This is a 'situated cognition' (cf. Lave 1988, Lemke in press-c) model, but one in which we are not talking in terms of folk-theories of 'minds' or interior 'mental' operations, but in terms of meaning-making as material activity deploying objects-that-are-also-signs (including words) according to the generative semiotic codes of a community. This is an 'ecological' view of social cognition, or, to cut out the middle-man, an _ecosocial_ view of collaborative semiosis.

I will only sketch the overall synthesis in these terms of the analyses I have already made; a complete discussion would become very long and complex, and we would lose the forest among the trees.

When Tim announces (line 1) he has made the CONE-TOP, he is holding it. He says he has made it, having in fact just <u>made</u> it by attaching the last parts to each other. It is 'made' in the sense that it holds

together as a single coherent object, and it is just when it has been made to do so that Tim presents it as an object, a named entity (semantically a Thing, a count-noun), a thematic-conceptual item, the CONE-TOP. It is a complex material object, a linguistically named entity, an 'idea' in the sense of a thematic element, and when 'presented' to the group, it becomes a sort of participant (an actant in Greimas' or Latour's semiotic usage).

The cone-top is visible, foregrounded, visually prominent now, and seeing it, having just been seeing and touching and manipulating the base of the tower, for Andy the juxtaposition in time, space, and immediate experience of the tower-base and the cone-top makes possible a contrast. One has a TRIANGLE (2a), the other is all SQUARES (5). Andy foregrounds this contrast and turns it into a 'problem' (line 2c) at the same moment he constructs the contrast itself verbally. Simon weighs in with something now that is not visible, a purely theoretical-imaginary, and possibly visualized PYRAMID (line 4). I do not know if this word had recently been used before this episode. One would have to trace its intertextual provenience. But both word and visualization are themselves semiotic operations: they depend for their meaning on verbal-semantic and visual-representational systems of semiotic relations across texts and images in a community.

Tim makes two proposals to save his cone-top. First he proposes to attach it by 'supports' a term we can be sure had been recently used, and associated no doubt with the building straws. It is a generic sort of solution, and it is very likely enhanced by (a) the presence of loose straws around, and (b) the habit, just enacted, of attaching straws together to build what is wanted. It is a small extension of what he has just been doing. The second proposal is made just as he sees and reaches for a pair of scissors on the table between him and the his opponents, between the cone-top and the tower-base (the two items which need to be connected). It is to 'cut it down', though it is not clear what that means or how it would solve the problem. It arises as a proposal at least in part from the co-presence of the scissors and their coming into attention in connection with the formulation of the problem as a CONE-TOP / TOWER-BASE relation and a TIM / SIMON-ANDY relation.

There was no 'problem' to be solved, no agenda of problem-solving, until a problem was created by the joint 'actions' of the participants -- all the participants, including the inanimate ones. Andy's initial comment about the triangular base of the cone-top elicits a 'So?' from Tim. It takes work to make a perceived and declared contrast, a difference (triangle vs square) into a 'problem', i.e. 'a difference that makes a difference' (cf. Bateson 1972), and a negative difference at that, relative to the Building-the-Tower agenda. The problem-solving agenda is emergent in the sense that both the existence of a problem, and the perceived need to solve it, and the actions that can retrospectively be seen as contributing to its solution, are all contingent: they all happen as sequents to previous actions that might have been different.

There is no very clearly articulated solution to the problem from those who pose it (Andy and Simon). Their proposals, like Tim's, are oriented to the immediate visual-tactile object of the cone-top, to do something to it to repair the triangle-square mismatch. It is in fact another problem that leads to a solution in the larger context of the agenda of building the tower, the agenda in relation to which the mismatch was construed as a problem ('gonna be hard to put on' line 2c). It is Tim's visualization, cone-top in hand, scissors in hand, building straws at hand, building experience so immediately in memory, the SQUARE-ness of the tower-base so salient, the work actually begun, of what his cone-top might look like with a square bottom, that leads him to enunciate a forecast (line 25): 'its gonna be a small square'.

This forecast is taken up by Andy as another problem. Tim has made another contrast: small vs. the large square top of the tower-base. In the foregoing context of how to put it on, this contrast becomes another problem. Andy, in line 26, acknowledges it as a problem ('So') by offering a solution: '... we'll make a lot of cubes and make them all smaller'. Like Simon's earlier use of PYRAMID, we don't immediately know the local intertextual provenience of CUBE here. Is this the work of visual imagination alone? Does it echo some earlier theme in their work? We do know that Andy is the one of the three who has just been intimately engaged both with the tower-base (working on it with Simon) and with the cone-top (analyzing it with Tim). He is the one who has most fully articulated verbally the nature of the mismatch problem, whose domain is the CONE-TOP/TOWER-BASE relationship. The tower-base itself is vaguely cubical; I don't know just what Simon has been working on ('Tyler's thing'), which was salient for Andy during their preceeding 'with'.

In any case line 26 is a thematic nexus, a point where, at least implicitly, in terms of the thematic formations needed to interpret its meaning intertextually (cf. Lemke, 1990; 1995b), all the thematic relations of the dialogue become interconnected. It is a sort of 'synthesis' point. My interpretation of it is that CUBES carries forward the theme of SQUARE (base, bottom, tower) in the context of the three-dimensional constructions they are working with, and that SMALLER picks up Tim's previous 'small square' in relation to the implied LARGE/SMALL mismatch Tim has projected. What is new is the PLURAL: that there can be more than one CUBE, each smaller than the last, with the largest matching the LARGE-SQUARE of the tower-base, and the last smallest one matching the SMALL-SQUARE of the cone-top. It is in fact the issue of PLURALITY that is taken up by Simon in the Coda, and which is very prominent in the post-focal section ('last cube' 'two cubes instead of three' 'just do one cube' etc.).

I do not see them drawing any pictures. It is not clear just how well they have formulated a visual model of the finished tower. I believe that at the end of the focal episode, the tower-to-be is still somewhat contingent, not fully specified semiotically. Tim's view of it as like the 'Empire State' (a classic step-back design built around rec-

tangular prisms in a sort of 'wedding cake' style) is as close as they come verbally at this point. But the Empire State model does not quite accomodate a 'cone-top' even a pyramidal one (like the Transamerica building) and Tim later seems to conflate Empire State with something that does taper in this way, the Eiffel Tower. There are culturally relevant semiotic resources, such as drawing images of the planned tower, which are not yet being used.

But in all that is being done, semiotic resources are being deployed in ways that are highly situation-specific. What is said and done, verbally and nonverbally, at each point, seems to be simultaneously meaningful in relation to the social-interactional relationships of the participants (human-to-human, human-to-inanimate, human to human mediated by inanimate actants), a sort of larger ecological world-building, and to the thematic development of verbal-visual means useful for this activity. The verbal-visual thematics are not here an end in themselves; they contingently contribute to the larger activity of building towers and making withs, which are themselves only two culturally separable aspects of a single activity.

The role of language here is both ancillary and constitutive. The verbal thematics is ancillary to the tower-building and the with-making in the sense that the organizing agendas of the total activity are better understood in relation to these than to the production of any coherent verbal text. These students are not trying to write an essay, state a principle, or even verbalize a solution to a problem. But the thematics is still constitutive in the sense that the activity could not happen without it, follows pathways contingent on what gets said, what its thematics meanings are, what thematic formations the items used belong to intertextually, etc. The verbal resources for social interaction (conversational genres, question-answer and proposition-challenge, challenge-response rhetorical patterns, moods and modalities and evaluative orienting forms -- not much discussed in this analysis, but important nonetheless), are certainly co-constitutive of the changing 'withs' of the group's social dynamics, just as are the proxemic and kinesic resources described. The thematic sequence depends on what is done social-interactionally, just as much as the other way around.

Human behavior, collaborative activity, is a whole; but we apprehend that wholeness mainly by analytically dividing it into the various semiotic strands from which it is woven, and then discerning the subtle warp and woof of meaning and material action which constitutes that wholeness.

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TABLE 1. ANALYTICAL TRANSCRIPT OF THE 'TOWERS' VIDEO SEGMENT

Thematic Chains and Social Interactions

| SIMON/Serge | TIM/Tyler | ANDY/Adam |
|---|---|---|
| **Pre-Focal:** | | |
| [Not use yet] | Making CONE-TOP | |
| Not yet | Can use CONE-TOP<br>I know | |
| ... | | |
| **Focal 'Problem-Solving' Episode:** | | |
| | 1. CONE-TOP | |
| | 2b. So? | 2a. TRIANGLE on bottom<br>2c. Hard to [attach] |
| 4. Make PYRAMID | | |
| | | 5. A PYRAMID<br>All SQUARES [on base] |
| 8. No, too hard | 6. Supports [to attach] | 7. No<br>9. [No,] Too hard |
| 11. [No vs. 10] | 10. No [vs. 8,9] | 13. [No,] Won't look good |
| 15. No, won't work [vs 6] | 14. [No to 13] | |
| 17. [Yes, cut] | 16. Cut it down? | 18. Cut bottom |
| 19. Make PYRAMID | | 20. Cut bottom |
| 21. Make PYRAMID | | |
| | 23. SQUARE? | 22. Bottom [must be] SQUARE<br>24. All SQUARES [on base] (cf. 5) |
| | 25. ...small SQUARE | 26. So CUBES all smaller |
| | 27. OK, I'll make [TOP] | 28. I'm making CUBES |
| 29a. Make 3 layers | | 29b. NOT! [vs. 29] |
| | 30. Make like Empire State | |

**Post-focal:**

| | | |
|---|---|---|
| | You make CUBES | |
| | | S making CUBES |
| Need 3 [CUBES] | | |
| | | Mine last CUBE? |
| | Last CUBE small | |
| | Needs CUBES | |
| 2 CUBES vs 3 | | |
| | I got CONE shape | |
| | | Want CONE for top |
| I know ... CONE | | |
| | ...CUBE... | |
| | | ...CUBE... |
| ...CUBE... | | |

==========

FOCAL 'PROBLEM-SOLVING' EPISODE (Rough Transcription)

1. Tim: See, here's the cone top [3sec]

2a. Andy: (but there's) a triangle on the bottom

2b. Tim: So?

2c. Andy: That's gonna make it hard to put it ON

3. Tim: (unclear)

4. Simon: Make a pyramid. Make a pyramid out of it.

5. Andy: A pyramid. And look, all these are squares here

6. Tim: Yeah, but we can just put a few supports like that and then put it on

7. Andy: No=

8. Simon: =Not really, that is too hard, fellas

9. Andy: It's too hard

10. Tim: No it isn't

11. Andy: Yes it is

12. Tim: You only (need)

13. Andy: It won't look good (then)

14. Tim: (Yeah, it will)

15. Simon: No, it won't work.

16. Tim: What, you want me to cut it down? [2sec]

17. Simon: That would work

18. Andy: Cut down the bottom

19. Simon: Just make a pyramid

20. Andy: Just cut down the bottom

21. Simon: All you have to do is just make a pyramid

22. Andy: The top, the bottom needs to be a square

23. Tim: A square?

24. Andy: Look, these are all squares [2sec]

25. Tim: You just need one thing there [8sec]
It's gonna be a SMALL square [2sec]

26. Andy: So we'll make a lot of cubes and make them all smaller [2s]

27. Tim: OK, you guys get started and I'm gonna make this

28. Andy: I'm making cubes [4sec]

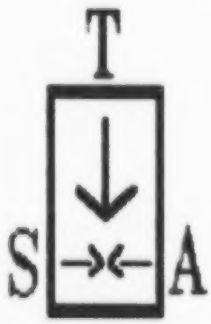
29a. Simon: Make it 3 layers high

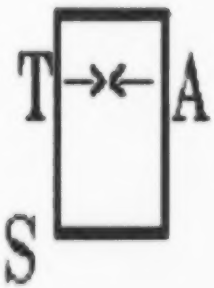
29b. Andy: NOT.

30. Tim: Let's make it sort of like the Empire State Building

PRE-FOCAL:

FOCAL:






POST-FOCAL: